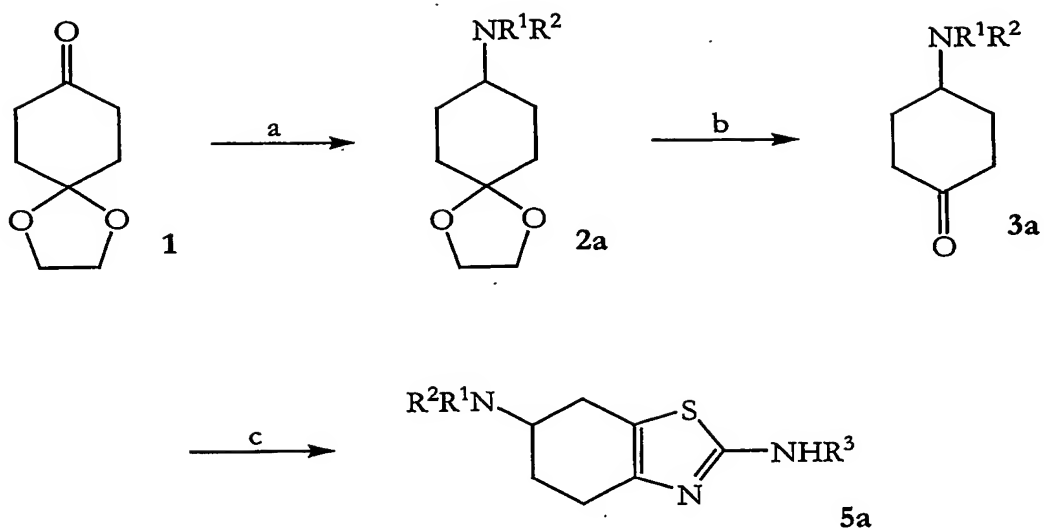


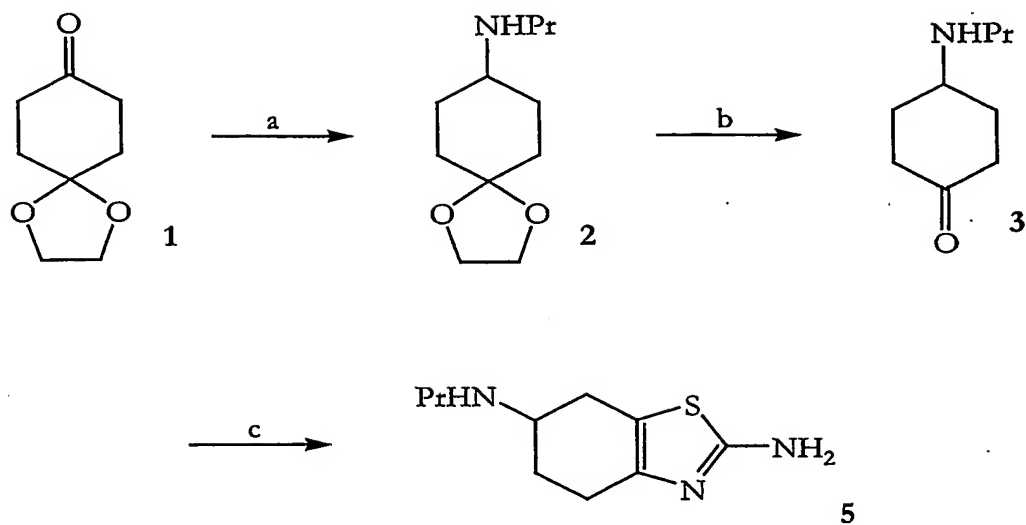
a: reductive amination with R¹R²NH
b: deprotection
c: (i) iodine, H₂N(C=S)NHR³; (ii) OH⁻

Figure 1



a: reductive amination with R^1R^2NH
b: deprotection
c: (i) iodine, $H_2N(C=S)NHR^3$; (ii) OH^-

Figure 2



a: *n*-propylamine, NaCNBH₃, MeOH/HCl

b: aq. HCl/THF

c: (i) iodine, H₂N(C=S)NH₂, ethanol, reflux; (ii) aq. NaOH

Figure 3

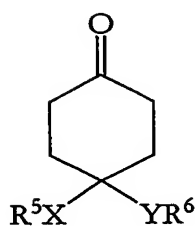
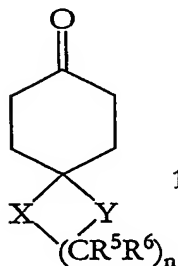
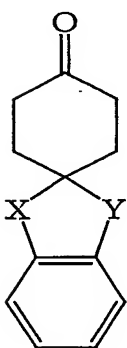
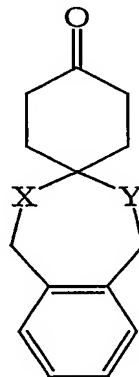
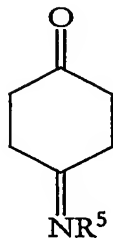
**1q** $X, Y = O, S \text{ or } Se$
 $R^5, R^6 = CO-R^7, Si(R^7)_3$, or an optionally substituted alkyl, alkenyl, alkynyl, aryl, arylalkyl, arylalkenyl, arylalkynyl, alkylaryl, alkenylaryl or alkynylaryl group, which may include one or more heteroatoms N, O or S in its carbon skeleton
 $R^7 = \text{hydrogen or alkyl}$ and/or $XR^5, YR^6 = CN$ **1r** $X, Y = O, S, NR^7 \text{ or } Se$ $n = 2 \text{ or } 3$
 $R^5, R^6 = \text{hydrogen, halide, or an optionally substituted alkyl, alkenyl, alkynyl, aryl, arylalkyl, arylalkenyl, arylalkynyl, alkylaryl, alkenylaryl or alkynylaryl group, which may include one or more heteroatoms N, O or S in its carbon skeleton}$
 $R^7 = \text{hydrogen or alkyl}$ **1s** $X, Y = O, S \text{ or } NR^6$ $R^6 = \text{hydrogen or alkyl}$ **1t** $X, Y = O, S \text{ or } NR^6$ $R^6 = \text{hydrogen or alkyl}$ **1u** $R^5 = N(R^6)_2 \text{ or } OR^6$
 $R^6 = \text{hydrogen, or an optionally substituted alkyl, alkenyl, alkynyl, aryl, arylalkyl, arylalkenyl, arylalkynyl, alkylaryl, alkenylaryl or alkynylaryl group, which may include one or more heteroatoms N, O or S in its carbon skeleton}$

Figure 4